

INDIAN STATISTICAL INSTITUTE

Telegram: STATISTICA, CALCUTTA-35
Telephones 56-3222-27 (6 lines)

203, BARRACKPORE TRUNK ROAD
CALCUTTA-35

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Dear Lederberg,

"Moon-dust" has now arrived, and is very stimulating. I thought of a few of the points in my articles on the origin of life in Vol 16 of New Biology and in "The Planet Earth" (Pergamon press 1957). But most are new. I was particularly interested in the problem, not so much of whether martial flora contains D N A, but whether they contain L deoxyribose and the amino-acids, sugars, etc of our series. I had thought that if they did this would support pan-spermia^a. But the recent discovery of the asymmetry of neutrinos (for that, as Abdus Salam has pointed out, is the easiest way of interpreting the non-conservation of parity) raises the question of whether Pasteur was right in attributing the asymmetry of living matter to "dissymétrie cosmique".

The whole matter is a challenge to our imaginations, and mine is not so agile as it was when I was your age. Your notion of "interstellai transduction", *is a whole stage, or more interesting than mine of "astroplankton"*, or perhaps "transformation" which adds nothing to Arrkenius. You do not explicitly mention the theory recently put forward, I forget by whom, that comets largely consist of "frozen" metastable molecules and radicals which explode when the sun heats them up. If there are enough metastable molecules around, and a mechanism for replenishing them, the conditions may exist for a self-replicating process using their energy, something perhaps not utterly unlike life, perhaps located in "dark" dusty nebulae.

I fear you will have great difficulty getting agreement as to non-contamination of the moon, and planets. If the Soviet people had suggested it, your government might look for political motives. Theirs probably will because your National Academy has done so. Personally I don't think the moon is a hopeful place for terrestrial organisms. Mars and Venus may well be.

Things are not too bad here. There are several lifetimes' biological research to be done without going outside the garden of this Institute.

Prof. J.L.Lederberg,
Dept. of Medical Genetics,
University of Wisconsin,
Madison,
Wisconsin,
U.S.A.

Yours sincerely,

J.B.S. Haldane
(J.B.S.Haldane)